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Experiments on the Thyroid and Parathyroid Glands. BY
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It has long been known that in dogs and cats excision of the thyroid gland is followed in the great majority of instances by death within a few days. In rabbits however the same result has not followed the operation. In these animals there are certain small glands called parathyroid: they are two, and are situated one on each side of the trachea. They do not at all closely resemble the adult thyroid for they contain no vesicles and no colloid but consist mainly of secreting cells arranged more or less in columns. As these glands are situated some distance below the thyroid proper, in operations for the removal of the latter they have not been excised. Gley finds that if with the thyroid gland the parathyroids are also removed the animals die. These experiments of Gley's have been repeated by the writer and it was found that (1) if the thyroid and parathyroids are removed the animals as a rule die: (2) if the parathyroids are alone removed no obvious result follows: (3) if the thyroid is removed and the parathyroids left some of the rabbits live and some die: some of these latter die with symptoms of chronic myxœdema, the hair falls out and a remarkable swelling occurs in the lower part of the face.

In these last experiments (group 3) the parathyroids are left to carry on all the work of the thyroid: they seem to hypertrophy somewhat but no marked changes are found even under the microscope: they certainly do not develop into thyroid tissue proper, no vesicles and no colloid appear even after the lapse of months.

Parathyroid glands also occur in dogs: but in them they are situated half embedded in the thyroid lobes, consequently in operations for the removal of the thyroid lobes they have also been removed. Gley however finds that it is possible with care to remove the thyroid lobes proper and to leave the parathyroids *in situ*; he finds too that if this is done the dogs do not die, but live. The writer found that if the whole of one lobe of the thyroid including the parathyroid be removed and also the greater part of the other the dog lives or dies according as the upper part with the parathyroid or the lower part without the parathyroid is left, that is to say if the second parathyroid is left the dog lives.

The portion of thyroid left and also the parathyroid left hypertrophy considerably: the former shews (1) a considerable hypertrophy of the secreting cells lining the vesicles, (2) the formation of new vesicles between the older ones, (3) sometimes also numerous vesicles empty of their colloid secretion as if it had been absorbed into the system. The parathyroid left shews mainly hypertrophy: there is no development of vesicles or colloid in it.

Parathyroids are also found in the sheep, the seal, the monkey and man: probably they occur in all mammals.

Although the tissue of the parathyroid gland does not at all resemble that of the thyroid in its adult form, there can be little doubt that they are intimately connected, not only on account of one being able to a great extent to replace the other physiologically but also because (1) the parathyroid resembles the embryonic form of the thyroid, (2) the two tissues are occasionally found side by side in the parathyroid of the dog, and because they are closely connected anatomically; in the monkey the parathyroid is embedded in the substance of the thyroid.

The effect of the administration of thyroid to normal animals was tried. The thyroids of sheep were given to dogs by feeding and in the form of extract injected subcutaneously in monkeys, and although large doses were given, and in the case of the monkeys repeated many days in succession, no visible effect was produced.


The attempt was also made to save by thyroid treatment animals which had undergone thyroidectomy. Out of twenty thyroidless dogs thus treated only two were saved: this is a larger proportion than recover without treatment, and further in the fatal cases the treatment prolonged life by a few days and the symptoms were modified, consisting mainly of emaciation and asthenia without the convulsive attacks of dyspnœa.

In thyroidless monkeys out of eight treated with subcutaneous injec-

tions of thyroid extract none recovered. The effects of injecting the defibrinated blood of a dog dying of athyroidia into a normal dog was tried with the result that certainly nothing more than an evanescent effect was produced: also from the spleens of dogs dead from acute myxœdema the albumoses were extracted (by the kindness of Mr White); they were injected into guinea-pigs with a negative result.

As bearing on Graves's disease the effects of the subcutaneous injection of Cocain was tried on monkeys: two grains proved fatal in a few minutes, successive attacks of convulsions being followed by gradual cessation of respiration. Injections of a quarter or a fifth of a grain of the hydrochlorate produced great exophthalmos with widening of the palpebral fissure and dilatation of the pupil: previous division of the cervical sympathetic prevented on the opposite side, at least to a great extent (as Jessop had previously observed in rabbits), the effect of the Cocain.

The experiments related were made at the Brown Institution.



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I think Brown-Séguard first suggested that the intracranial blood might be lessened through its action upon the muscular tissues of the cerebral vessels. At least, Dr. J. Crichton Brown (*Practitioner*, June, 1871) accords Brown-Séguard priority, and used it successfully in lessening the excitement of maniacs.

Hammond advised its applicability in active cerebral congestion; but I believe that Spitzka originally conceived the idea of equalizing the circulation of epileptics by its use, and thus aborting the arterial spasm upon which the disease apparently depended.

In my hospital and private practice I have had good opportunities to test the efficacy of special drugs, and since introducing full use of *secale cornutum*, the internes find diminished use for opium.

More than twenty epileptics at my clinics were benefited by ergot, in combination with natrium bromide. Half these cases I have every reason to regard as permanently made better—if not cured. Every one was treated as individual peculiarities seemed to require, and routine dosing was found to be hurtful. In one case of cerebral gumma, and another with a cardiac lesion, ergot intensified the fits, whereupon it was displaced by specific treatment and digitalis, with good results.

Lessening of the vertigo and psychical aberrations followed its administration in one case of cerebellar tumor, proven to have been such *post mortem*.

Three cases of exophthalmic goitre began to amend with the first drachm of the fluid extract. One female, æt. forty, had been treated for rheumatism and anæmia, the pains and facial pallor misleading the prescribers. The color returned to the face and the intrascapular suffering ceased as the tumor of the neck disappeared under the constricting influence of the medicine.

It is conceivable that want of blood in the face and head may often depend upon dilatation of vessels in other parts of the body, and thus mere symptom-treatment would be absurd. Where such paleness was due to an aneurism, physiologically, the etiolation should have little consideration.

Instead of chloral I use secale with Na Br in delirium tremens, and the sequelæ of alcoholic debauches. The insomnia, tremors, and restlessness are rapidly relieved by this combination, where the chloral temporarily stupefies. In aggravated cases conium maculatum and hyoscyamus are added with prompt results.

I succeeded in restoring the reason and use of his limbs to a post-hemiplegic insane inventor by continued use of ergot with KI. The inception and persistence of the trouble were clearly due to an engorged brain, which, outside of the hospital had rapidly grown worse under large morphine doses given by a homœopath.

Ergot quells the excited stage of katatonia, and may be given during the stuporous period for the purpose of anticipating the succeeding mania. Indeed there is reason to think that all alternating phases of this psychosis are abbreviated by its use.

The full value of ergot is by no means appreciated by the profession, yet, as is the case with every other drug, it is capable of doing injury.

In hysteria, with or without digitalis, I have seldom found it amiss. According to my theory (set forth in "Comparative Physiology and Psychology," 1885), in this condition there is a disparity between the cerebral blood supply to centres and the cerebro-spinal nervous stimulation, so that when excitation occurs, over a cerebral or spinal tract, the necessary customary vaso-motor synchronous action does not take place, or it drives the blood to a contiguous or other point, distant from the centre that healthily should receive the nutrition. Ergot tends to hold the calibre of the arterial system in tone and to overcome such aberrations. Digitalis aids this tonus, through its special cardiac effect, and partially also antagonizes hysteria by the nausea it induces, when taken in pretty full doses.

A case of recurrent congestive headaches in my own family led me to notice the full value of ergot when judiciously given. When these cerebral torments were of the active or arterial type the relief afforded by a teaspoonful dose of the fluid extract was noticeable, particularly in the inception, in